

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter contains descriptions of the setting of the Decision Area and Planning Area and the current conditions of the environment for each resource or use. This information provides the basis for evaluating the potential effects to these resources from the different land management proposals under each alternative.

ACCESS AND TRANSPORTATION

Travel within the monument occurs on a variety of routes. Map 6 (in the map pocket) shows all routes within the monument, including the following four route categories:

- Primary access route (BLM 1011/FS Road 266), including a portion authorized by Cooperative Agreement with Pueblo de Cochiti (Tribal Road 92);
- BLM facility maintenance roads;
- Unimproved trail routes (two-track roads); and
- Private access trail routes (unimproved).

Primary access to the monument from State Road 22 (paved) is through Pueblo de Cochiti land on about 2.75 miles of graveled road (Tribal Road 92) that is managed cooperatively by the BLM and the pueblo. This road, which the BLM maintains, is the only access into the monument. The road continues across BLM federal land for about 1.8 miles, then private land for about .99 mile, state land for about .95 mile, BLM land for about .67 mile, back again across state land for about .19 mile, and finally again across BLM land for the last 1.3 miles to the northwest corner of the monument (refer to Map 6). This road has been in existence since July 13, 1908 on Cadastral Survey maps. (Note: Although the map for the Santa Fe National Forest shows Forest Service Road 266 crossing BLM land, no record exists of a right-of-way

issued to the U.S. Forest Service by the Pueblo de Cochiti, the Bureau of Indian Affairs or the BLM.)

The Cooperative Agreement between the BLM and the Pueblo de Cochiti provides BLM staff access on Tribal Road 92 to resources and services. Occasionally this access road is closed by order of the Pueblo Governor. The BLM recognizes the need for privacy by the pueblo at certain times, and works with the tribal members to notify the public when the need for road closure arises.

In the northwest corner of the monument (Section 30, T. 17 N., R. 5 E.—refer to Map 6), this main access road (BLM Road 1011) is gated, seasonally locked and closed by the BLM in coordination with the Forest Service. The purpose of the closure is to minimize resource damage and relieve stress on big game.

A two-track road stems off BLM Road 1011 in this northwest monument corner (Section 30) about ¼ mile beyond the locked gate. This road branches off into several locations in the monument, private land to the southwest, and the Santa Fe National Forest to the west. A BLM facility maintenance two-track road accesses a wildlife water catchment located within the north half of Section 31, T. 17 N., R. 5 E. about ½ mile from BLM Road 1011.

Another two-track road branches off to access the private land in the south half of Section 31, T. 17 N., R. 5 E. No legal access has been authorized to the landowners through the federal land. In the recent past the BLM worked with the Conservation Fund to acquire private land in Sections 6, T. 16 N., R. 5 E. and the S½ of Section 31, T. 17 N., R. 5 E., using Land and Water Conservation Funds. However, the negotiations were unsuccessful. The road leading into this area may need to be maintained for access if the land is acquired by the BLM.

The northeast corner of the monument has an east-west road crossing through Section 27, T. 17 N., R. 5 E. This road branches out and was once used to access several local pumice mine sites. The mine sites have been reclaimed, so this road is no longer needed for access. Several roads branching off this main access are washed out and would need to be evaluated for reclamation, access to federal land or development of a recreational trail.

A two-track road that stems off the main access road on the southeast (Section 3, T. 16 N., R. 5 E.) was used to access other pumice mines and also may have been used historically for wood-cutting. The BLM has closed this road using signs and rocks, will most likely keep it closed and reclaim it.

Other two-track unmaintained roads shown on Map 6 were also used to access mine sites and are currently washed out and impassable.

Several BLM-administered trails also exist in the Planning Area. They are discussed below in the Recreation section.

AMERICAN INDIAN USES AND TRADITIONAL CULTURAL PRACTICES

A diversity of deeply rooted cultural traditions is one of the special characteristics New Mexico offers to both local citizens and visitors. Proclamation 7394 designating the national monument recognizes this and directs the Secretary of the Interior to address actions to further the purposes of the American Indian Religious Freedom Act. The proclamation specifically recognizes the close ties that exist between the monument lands and the Pueblo de Cochiti. Other tribes including Santo Domingo Pueblo, Jemez Pueblo, and Zia Pueblo also have concerns in this area. In addition to American Indian tribes, local Hispanic families and communities also have used these lands for many years.

Pueblo Indian Uses of the Planning Area

Pueblo Indian religious beliefs and traditional cultural practices such as hunting and gathering of wild plants are intimately tied to specific places on the landscape. For many of these activities, a majority of tribal members may not visit or even know of these places, but they are important to the entire pueblo. Confidentiality is so important that Pueblo Indian people are sometimes bound by tradition to allow loss or destruction of traditional cultural places rather than speak openly of them. In accordance with the wishes of these groups, the BLM does not solicit specific information about traditional cultural places. Instead the agency seeks to keep interested pueblos informed about activities proposed within the Planning Area, giving them time to respond if traditional uses are likely to be affected. Major concerns include issues of access, privacy, and conflicting uses or proposed activities.

Repatriation

Because of their tribal histories, several American Indian groups may have affiliation with archeological materials found in the Planning Area, although they have not indicated that they maintain traditional cultural places there. These tribes include the Hopi and the Jicarilla Apache Nation. They have stated that they wish to be consulted whenever materials are found that are subject to the Native American Graves Protection and Repatriation Act, that is, human remains or objects of cultural patrimony.

CULTURAL RESOURCES

National Monument

The earliest documented use of the monument was during the Late Archaic Period, around A.D. 200. Ongoing surveys suggest that light scatters of chipped stone with occasional

grinding stones, concentrations of burned rock, and buried hearths or fire pits dating from this time are fairly common in mesa-top settings within the monument.

Throughout most of the remainder of human occupation, the monument itself has been on the periphery of more intensively used areas. Although puebloan peoples moved into the Parajito Plateau area in large numbers beginning around A.D. 1200, these developments were more focused on the Rio Chiquito drainage to the east and northeast. One small masonry pueblo and the cavate room (cut into the soft rock) found near the Tent Rocks Picnic Area probably both date between A.D. 1200 and 1540, but the main area of settlement during these times was further east. A very poorly preserved petroglyph engraved on soft tuff in the slot canyon behind Tent Rocks may also be prehistoric, although this is not certain.

The Cochiti Mining District boomed between 1900 and 1910, and one of the major routes to Bland and other mining towns passed through Peralta and Colle Canyons. A well-preserved dugout, ruins of a house, and a rock and cement dam across Peralta Canyon are all that remains of the Rivera Homestead, which was established shortly before 1900. Between 1933 and 1942, a large Civilian Conservation Corps (CCC) camp existed on the Rivera property (the edgeholding to the southwest of the monument), which hosted workers building the road between Cochiti and Ponderosa, New Mexico. Almost nothing remains of the camp itself, but gabions (refer to the Glossary) and other erosion-control features built by CCC workers are scattered through the monument.

Inventories conducted to date show that prehistoric sites are most common in mesa-top settings and are rare along the bottom of Peralta Canyon and its tributaries. In contrast, the CCC-constructed features and the camp itself are in the canyon bottom. So far, historical remains found on the mesa tops are relatively recent scatters of trash that resulted either from camping or deliberate dumping.

Planning Area

In the larger Planning Area, cultural resources on the private inholding property and in the western half of the Cañada de Cochiti Grant are expected to be similar to those in the monument. However, the eastern half of the Cañada de Cochiti Grant was densely occupied between A.D. 1100 and 1600, with almost 300 archeological sites dating to this interval being reported. Early in this period pithouses may have still been in use, but through time surface roomblocks made of masonry and jacal (refer to the Glossary) become more common. Other kinds of sites associated with this interval include agricultural features such as terraces, rock gardens, and dams. During the latest part of this period, Puebloan people built very large, aggregated pueblos, sites that often included hundreds of contiguous rooms built around one or more open plazas. One of these, Kuapa, is located in the Cañada de Cochiti Grant, 2 or 3 miles east of the monument. This site probably included over 1,000 rooms with multiple plazas, and was clearly one of the major population centers in this region.

Cochiti and Santo Domingo were among the pueblos occupied in 1540 when the Spanish arrived, and by the early 1600s missions had been established at these pueblos. In 1680 the Native People under Spanish dominion revolted, forcing the Europeans to retreat to El Paso. In the aftermath of this revolt, many of the pueblos moved their entire communities to defensible, mesa-top locations, anticipating that the Spanish would return. The Cochiti built a 200-room pueblo on a sheer-sided mesa about 1.5 miles north of the monument. This site, known variously as Old Cochiti or Kotyiti became a major center of pueblo resistance during this period. Most remains pertaining to this episode are probably on lands owned by Cochiti Pueblo or by the U.S. Forest Service.

In 1732 the Cañada de Cochiti Land Grant was issued to a scattered settlement of farmsteads and ranches along the Rio Chiquito near Old Cochiti (Kotyiti), and several Colonial Period Hispanic sites have been recorded in the eastern

part of the Cañada de Cochiti Land Grant. More recent historical remains are not well documented in the Planning Area.

GEOLOGY, MINERALS AND PALEONTOLOGY

Geology

The Kasha-Katuwe Tent Rocks National Monument is located regionally along the western edge of the Rio Grande Rift System. This rift (fault or stress-caused crack in the rock layers) is north-south trending and runs from central Colorado to Mexico. The system is composed of a series of sediment-filled basins of Tertiary age (over 2 million years old). The structural San Juan Basin, to the west of the monument, covers most of the northwest quarter of New Mexico. Rocks in this basin range from Precambrian to Tertiary in age.

Locally, the monument is on the southeast edge of the Pajarito Plateau, in Peralta Canyon. The Pajarito Plateau, located on the southeast flank of the Jemez Mountains, was formed by pyroclastic (ash) flows resulting from volcanic explosions. This plateau, a collection of finger-like mesas, resembles a broad, pleated skirt that spreads down from the eastern flanks of the Jemez Mountains to the floodplains of the Rio Grande. (“Pajarito,” Spanish for “little bird,” applies to the central geographic feature of the area, Pajarito Canyon.) The Jemez Mountains are a volcanic range, the main feature of which is the Valles Caldera, a large volcanic crater.

The Bandelier Tuff forms the Pajarito Plateau and outcrops in the area. This formation consists of Tertiary age pyroclastic flow deposits. Historically, exposed Tent Rocks layers were designated the Tertiary age Peralta Tuff Member of the Bearhead Rhyolite. Recent opinion is that only the interbedded tuff and gravel section is the Peralta, while overlying caps, sand, and gravels are in the Cochiti Formation.

The national monument landscape has been shaped by volcanic deposition, faulting,

transport of materials, and erosion. These processes occurred 6 to 7 million years ago, with erosion and deposition continuing today. The unique shaped “tents” are formed when weathering processes that erode pumice and tuff deposits encounter resistant welded tuff.

Minerals

Stratigraphic (layered rock) materials present in the national monument include: white-gray rhyolite (refer to the Glossary); white-tan, lithic-rich ash-fall tuff (constituent particles consist of pumice, perlite, and lithics, including “Apache Tears” obsidian); sand and gravel; and resistant volcanic caprocks. These caprocks form the top layer of the softer-layered, tent-shaped features called “hoodoos.”

In the 1950s pumice was mined within the monument boundaries. Literature, aerial photographs, and field inspection indicate that 27 pumice mining features are present. Specifically, two abandoned mines exist (Section 29, SW¼ and Section 28, SE¼), with 25 open cuts in Sections 27, 28, 30, and 34 (all in T. 17 N., R. 5 E). Material present in these features is buff-to-white, cellular volcanic glass which is commonly of rhyolitic composition. It is found as a fragmented aggregate with sand- to cobble-sized particles. The field inspection showed all highwalls to be naturally sloped and, along with the waste dumps, revegetating.

Mining claims in the area were made between 1975 and 1987, but all are now closed. The Cochiti (Bland) mining district is to the north. Mines there contained gold, silver, copper, and lead, so some of these metals could be present in stream gravels within the monument.

The national monument lies within Known Geothermal Resource Field #2, but no leasing has occurred within monument boundaries.

Under Presidential Proclamation 7394 of January 17, 2001, all federal lands within monument boundaries are withdrawn from all forms of entry, including mineral disposition. Therefore, no mineral development may occur there.

Paleontology

Current literature shows that no vertebrate or invertebrate fossils have yet been discovered within monument boundaries. Vertebrates living in New Mexico during the Tent Rocks formation would have been from the late Miocene, Pliocene, and Pleistocene geologic epochs (1.8 to 22.5 million years ago). Fossils found in the state representing these epochs are: gophers, moles, dogs, horses, rabbits, camels, glyptodonts (armadillos), beavers, pikas, pronghorn antelopes, mammoths, bison, and proboscideans (an early form of elephants). During this time the landscape was affected by explosive and other volcanic events, had little or no vegetation, and therefore little animal life. The lack of vegetation also would have resulted in greater erosion during rainstorms and snowmelt. However, some soil horizons present in the monument indicate quiet periods during which vertebrates could have lived, died, been buried and preserved as fossils.

The BLM has an assistance agreement with the New Mexico Museum of Natural History and Science. Under this agreement, any vertebrate fossils found on BLM federal land outside the permitting process can be taken to the museum. This will ensure that the fossils will be available to the people of New Mexico and the U.S.

LANDS AND REALTY

The Kasha-Katuwe Tent Rocks National Monument encompasses approximately 4,124 acres of federal lands and minerals (both administered by the BLM), approximately 521 acres of state land and minerals, 757 acres of private land (surface), 316 acres of private minerals, and 441 acres of federal minerals underlying private surface. [Table 3- 1 shows the legal description of lands in the monument. The slight differences between the legal acreages shown in this table and the GIS (Geographic Information Systems) acreages just given in the text are explained in Chapter 1, page 1-2, and in Table 101 on page 1-9. The analysis done throughout the text is based on the GIS acreages given above.] The

private land adjacent to the southwest portion of the monument contains approximately 965 acres. The Cañada de Cochiti Grant directly north of the monument (refer to Map 3 in Chapter 1) contains approximately 9,268 acres owned by the University of New Mexico. The Planning Area is located in Sandoval County.

Land Use Authorizations

The monument's federal land supports two grazing leases, one each for the Peralta and Tent Rock Allotments. Although mainly unimproved, the monument contains the following structures: minor ranch improvements, a wildlife water catchment and historical structures associated with a homestead on the private lands, and the Veterans' Memorial Scenic Overlook. No other land use authorizations exist within the Planning Area. Existing land use plans for the area do not designate any utility corridors, nor does the Western Utilities Group's Regional Corridor Planning identify any corridors there. Rights-of-way and land use permit applications are authorized on a case-by-case basis with mitigation measures and stipulations developed to protect the resources and values for which the monument was established.

Presidential Proclamation 7394 withdrew the federal lands (surface and subsurface) in the monument from "... all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws." Therefore, none of the public (federal) land or interests in land within the National Monument is subject to disposal. The proclamation provides for the automatic withdrawal of all new acquisitions within the NM from mineral entry and leasing, and from disposal under the public land laws.

The BLM continues to acquire surface and mineral interests to consolidate ownership within or adjacent to the monument. Acquisitions are examined through the environmental analysis process, including public participation.

As private lands are acquired, mineral rights will also be acquired, when possible. All private lands are acquired only with the consent of the

property owner. Proclamation 7394 states that lands and interest in lands within the monument not owned by the United States will be reserved as a part of the monument if and when the BLM acquires them.

Three private individuals or families own land within the national monument boundaries. Under the Stockraising Homestead Act, the federal government transferred title to these private parcels in the early 20th century. The primary use of the properties has been subsistence farming and ranching.

Recently the BLM has worked with staff from the Conservation Fund, a non-profit organization, to acquire approximately 1,722 acres of private inholdings and edgeholdings to be included in the monument, using Land and Water Conservation Funds. Although the CF staff worked diligently, they were unsuccessful in acquiring the private lands. The BLM also is

working with one landowner to purchase a road easement across the private land in T. 17 N., R. 5 E.

Improvements

Improvements on the private properties within the monument consist of a fence on or near the property boundaries, except along the north. The fence on the west is relatively new, with four wires and stays. Cattle guards have been installed where the public road intersects the property's east and west boundaries. Although breached, an old dam still exists in the narrow canyon in the Section 29, SE $\frac{1}{4}$ SE $\frac{1}{4}$, T. 17 N., R. 5 E. Below the dam, remnants of an old homestead and irrigation ditch are apparent. Also present are a small holding area for livestock and two water wells. Each well is housed in a small building, and one is outfitted with a gasoline pump as backup.



The BLM is working to acquire some of the private lands surrounding the Monument.

TABLE 3-1

**LEGAL DESCRIPTION OF LANDS
IN THE KASHA-KATUWE TENT ROCKS NATIONAL MONUMENT ^a
(New Mexico Principal Meridian)**

Legal Description	Acres	Legal Description	Acres
<u>Public Surface: T. 16 N., R. 5 E.</u>		<u>Private Surface: T. 17 N., R. 5 E.</u>	
Sec. 3, lots 1 to 6, inclusive, S½NW¼ & SW¼;	506.98	Sec 28, S½SW¼, SW¼SE¼;	120.00
Sec. 4, lots 1 to 4, inclusive, S½N½ & S½;	636.52	Sec 29, NE¼SW¼, SE¼;	200.00
Sec. 5, lots 1 to 4, inclusive, S½N½ & S½.	638.24	Sec. 32, N½NE¼, SE¼ NE¼;	120.00
<u>Public Surface: T. 17 N., R. 5 E.</u>		Sec 33, N½.	320.00
Sec. 27, lots 4 to 8, inclusive, S½;	343.09	Total private surface acreage	760.00
Sec. 28, lots 1 to 4, inclusive, N½S½ & SE¼SE¼;	222.56	<u>Private Minerals: T. 17 N., R. 5 E.</u>	
Sec. 29, lots 1 to 4, inclusive, NW¼SW¼ & S½SW¼;	142.56	Sec 29, NE¼SW¼, SE¼;	200.00
Sec. 30, lots 1 to 4, inclusive, S½;	342.00	Sec. 32, N½NE¼, SE¼NE¼.	120.00
Sec. 31, N½;	320.00	Total private mineral acreage	320.00
Sec. 33, lots 1 to 4, inclusive, & N½S½;	321.80	<u>State Land & Minerals: T. 17 N., R 5 E.</u>	
Sec. 34, lots 2 to 5, inclusive, N½ & N½S½.	640.12	Sec. 32, lots 1 to 4, inclusive, SW¼ NE¼, NW¼, N½S½.	520.95
Total public acreage	4,113.87	Note: ^a Refer to page 1-2 of Chapter 1 and Table 1-1 (page 1-9) for an explanation of the differences between the acreages in this table and those used throughout the text.	

Improvements on the private property adjacent to the west side of the monument consist of perimeter fencing that is down or in poor condition. A dirt tank located near the center of Section 6, T. 16 N., R. 5 E is essentially filled with silt. Another dirt tank near the center of the south boundary in the same section exists at the location of old homestead ruins. This tank can hold a small amount of water.

No deep livestock or domestic wells have been developed on the bench or mesa top of this adjacent private land. Each parcel (S½ Sec. 31, T. 17 N., R. 5 E. and Sec. 6, T. 16 N., R. 5 E.) has a shallow well dug in the bottom of Peralta Canyon. The north parcel is at the location of an old homestead ruin near the center of the west

boundary. A spring exists in the extreme northwest corner of the north parcel, with an old shallow well in the canyon in the south parcel near the west boundary of the section.

No significant improvements have been made on the property owned by the State of New Mexico, which has been encumbered by a grazing lease since the early 1970s. The grazing lessee drilled a 700-foot well in 1971 to water cattle on the southeast corner of the parcel. Minor corrals and water facilities have been built, and some fencing remains along some boundaries. The BLM, the New Mexico State Land Office, and Santo Domingo Pueblo are negotiating an exchange in which this property would be acquired by the BLM.

The Cañada de Cochiti Grant, which lies directly north of the monument and is owned by the University of New Mexico, has recently been the subject of negotiation in an exchange with the New Mexico State Land Office for parcels in Albuquerque. More recently, UNM and the Pueblo de Cochiti have completed a land exchange in which the pueblo acquired 212 acres of Horn Mesa within the grant in exchange for a road easement to the grant's east end (refer to Map 3 in Chapter 1).

The Sandoval County zoning for the private property in the vicinity of the national monument is Rural Residential Agriculture (RRA). This zone provides suitable sites for rural activities and home developments. Minimum lot size for this type of zoning in New Mexico is $\frac{3}{4}$ acre. Subdivisions of 5 lots or less require only administrative summary review.

TABLE 3-2
LIVESTOCK GRAZING PERMITTED
IN THE NATIONAL MONUMENT

Item	Tent Rocks Allotment (#0122)	Peralta Allotment (#0123)
Federal acres (percent of allotment)	2,080 (85)	2,008 (65)
No. of cows grazed (season)	15 (yearlong)	36 (spring & fall), 15 (summer)
Season of use	3/1-2/28	3/15-12/31
Preference (Animal Unit Months)	156 AUMs	147 AUMs
Range improvement projects permitted	<ul style="list-style-type: none"> • .75 mile of fence (CA)^a 	<ul style="list-style-type: none"> • 1 cattleguard (CA)^a • 2 dirt stock tanks (RIP) • 2.25 miles of fence (RIP)

Note: ^a CA—Cooperative Agreement; RIP—Range Improvement Permit. Cooperative agreements authorize the building & maintenance of an improvement by both the BLM & a permittee. Range Improvement Permits authorize grazing permittees to build & maintain an improvement on BLM federal land solely with private funds.

LIVESTOCK GRAZING

The BLM manages two grazing allotments on federal land within the national monument. They are the Peralta Allotment and the Tent Rocks Allotment, as described in Table 3-2 above.

Data from vegetative inventory and monitoring studies are used to evaluate the need for changes in allotment grazing management. Changes in grazing management should result in long-term

improvement in vegetative condition for wildlife habitat and watershed protection as well as for livestock grazing use.

Both of these allotments are in the “Improve” management category. Placement in this category requires that the BLM manage these permits in a manner that will improve the rangeland ecologic condition. This improvement is to be accomplished through more intense range management and/or reduction in grazing authorization (cattle numbers).

RECREATIONAL USES

Elevation of the monument ranges from 5,570 feet to 6,760 feet above sea level. South-facing exposures provide recreational and educational opportunities during all seasons. A 2-mile National Recreation Trail was designated in 1992 and the area was designated as a Standard Amenity Fee Site in 2005.

The area surrounding the national monument is enhanced by existing destination and recreation sites such as Cochiti Lake (administered by the U.S. Army, Corps of Engineers), Bandelier National Monument (administered by the National Park Service), Pueblo de Cochiti Golf Course, Dixon's Apple Orchard, Santa Fe National Forest (administered by the U.S. Forest Service), and the Valles Caldera National Preserve.

Partnerships and Cooperative Management Agreements

The Pueblo de Cochiti serves as the gateway community to the monument, with 3 miles of the primary access road traversing the pueblo's lands. The BLM and the Pueblo de Cochiti signed a Cooperative Management Agreement in 1997, forming a partnership to provide for public access and to manage and maintain the Tent Rocks ACEC and fee site. To monitor and maintain the site, the pueblo receives \$25,000 on an annual basis and 35 percent of the visitation fees collected.

Before the monument was designated, the pueblo and the BLM had signed an Inter-Governmental Cooperative Agreement in 2000 for the cooperative management of tribal and federal lands at Tent Rocks. The intent of the Cooperative Agreement is to increase federal land management effectiveness, enhance natural resource program coordination, provide an opportunity for joint public outreach, and ensure a greater level of consistency and effectiveness in public and pueblo land use planning.

The BLM also formed a partnership with Sandoval County through an Assistance Agreement for road maintenance, and has an informal

agreement with the University of New Mexico (UNM) for geologic interpretation.

Recreation Opportunity Spectrum

For the *Rio Puerco Resource Management Plan*, the BLM completed a Recreation Opportunity Spectrum (ROS) inventory for the Tent Rocks ACEC. The management emphasis is on interpreting geologic and scenic values, and on intensive recreational use, specifically Semi-Primitive Non-Motorized recreational opportunity. BLM Road 1011, which traverses the monument, is part of the zone classified as Roaded Natural.

The ROS provides a framework for defining classes of outdoor environments for recreational opportunities (refer to Appendix E). These opportunities can be described in terms of three principal components, the activity, the setting, and the experience. Possible mixes of these components are arranged along zones. The ROS management objectives for the Semi-Primitive Non-Motorized and Roaded Natural zones located within the boundaries of the Tent Rocks ACEC/National Monument are defined as follows.

The Semi-Primitive Non-Motorized zone is managed to be largely free from the evidence of humans, their restrictions and controls. Motorized vehicle use is prohibited. Projects should be designed to protect natural values. Recreational activities occurring in this zone include hiking, picnicking, viewing scenery, and nature study. Frequency of BLM contact with users is low.

The Roaded Natural zone is managed to provide a natural-appearing environment with moderate evidences of the sights and sounds of humans. Motorized use is permitted. Concentration of users is moderate, with evidence of other users widespread. Resource modification and use practices are evident, but harmonize with the natural environment. Developed facilities for motorized use are provided, and placement of management facilities is favored in this zone. Recreational activities include picnicking, nature study, and viewing cultural and natural

resources. Staging areas for backcountry use and for interpretation of geological features occur in this zone. Frequency of BLM contact with visitors is moderate to high.

Recreational Activities

Since the area was assigned ROS zones of Semi-Primitive Non-Motorized and Roaded Natural, limited management activities have taken place. In accordance with Title 43 of the Code of Federal Regulations (CFR), Part 8365.2, the monument is for day use only [under supplementary rules published in the *Federal Register* on May 10, 1996 (61 FR 92: 21479-83)].

Passive recreational activities include hiking, photography, environmental education, scientific studies, bird watching, wildflower viewing, picnicking, and creating artwork. Mountain bike riding is limited to the existing access road (BLM Road 1011).

One permit has been issued for horseback riding, limited to the southern portion of the monument. One Special Recreation Permit has been issued to a commercial outfitter for guided hiking tours, limited to the exiting trails.

The monument is a popular area for university and professional scientific societies to conduct geologic field trips, and serves as an outdoor laboratory for environmental education classes. International Migratory Bird Day (in 2003 and 2004) and three National Public Lands Day events (in 2000, 2001, and 2003) have been observed at the monument. Environmental education classes and recreation (hiking) are the major demands by the public. School groups use the monument for research and educational field trips. An average school group consists of 80 people, including students, teachers and parents.

Motion picture productions made at Tent Rocks have included “Silverado,” “Lonesome Dove,” “Young Guns II,” “High Desert Kill” and “Earth II.” Since monument designation, commercial film permits limit such activity to hand-held cameras only, no props, the involvement of three to five persons, and filming themes that are

complimentary to the passive recreational uses of the monument (e.g., advertising for sports-wear).

For visitors wishing to spend the night, the Cochiti Lake area (located 5 miles east of the monument) contains facilities for camping, large groups and recreational vehicles.

Visitation and Standard Amenity Fee Site

In 1996, the Tent Rocks ACEC became a Standard Amenity Fee Site, with fee collection beginning in March 1998. The monument brochure outlines the fee schedule and permit requirements. [Note: Golden Eagle, Age and Access Passport holders are not required to pay the monument entrance fee, nor do public and private school groups.]

A traffic counter was used from 1998 until 2000, and in 2001, the BLM began using the fee envelopes to approximate the number of visitors. One fee envelope represents one vehicle with an average of 2.9 users per vehicle. The monument is visited primarily by New Mexico residents from the Albuquerque and Santa Fe metropolitan areas, as well as from the City of Rio Rancho (located in Sandoval County, this is the fastest-growing community in New Mexico). Many international visitors also frequent the monument. An annual report to the Congress required for the fee site reflects the visitation trend shown in Table 3-3 below.

Fee collection began in 1998. Fees are collected on an honor system under which the visitor deposits a fee envelope into an iron pipe. Under BLM fee collection regulations, the fees are collected and counted by the agency and the Pueblo de Cochiti on a weekly basis. If visitation is higher during the spring and autumn months, fees are collected and counted twice a week.

All fees collected are returned to the site, which assists greatly in defraying costs for operation and maintenance. Under the Cooperative Management Agreement between the Pueblo de Cochiti and the BLM (signed in 1997),

TABLE 3-3

**TREND IN USER NUMBERS FOR KASHA-KATUWE TENT ROCKS
ACEC/NATIONAL MONUMENT, 1998-2004**

Year	No. of Users	Year	No. of Users
1998	8,600	2002	45,000
1999	17,200	2003	49,500
2000	14,600	2004	50,000
2001	25,053		

25 percent of the fees collected were returned to the pueblo for operations (monitoring and maintaining the site and visitor services) in 1997-98; this percentage was increased to 35 in 2000. Table 3-4 below shows the fees collected between 1998 and 2004, with the facilities developed and funds contributed for operations by the pueblo.

Trails

A National Recreation Trail (NRT) was designated in 1992 and is for foot travel only. This trail contains two segments that provide opportunities for bird watching, geologic study and observation, photography and plant identification. Both segments of the NRT begin at the designated monument parking area and are maintained by the BLM.

The first segment, the Cave Loop Trail, is 1.2 miles long and is rated as easy. The more difficult segment, the Canyon Trail, is a 1.5-mile, one-way trek into a narrow canyon with a steep (630-foot) climb to the mesa top. There, visitors have excellent views of the Sangre de Cristo, Jemez, and Sandia mountains and the Rio Grande Valley.

Approximately .5 mile of the Canyon Trail is built under the principles of universal design and access (as required by the Americans with Disabilities Act). This portion of the trail begins at the trailhead and ends at the entrance to the canyon. This segment meets the needs of parents with strollers, small children, seniors, and visitors using wheelchairs. The BLM is also

building a 1-mile trail segment near the Scenic Overlook in the northwest corner of the monument using the same design principles.

Interpretation

An interpretative kiosk is located at the National Recreation Trailhead. The BLM is completing beginner bird and wildflower guides as well as updating the kiosk and monument brochure. Interpretive panels on the area's geology are also being prepared. The monument is a self-guided experience, although occasionally BLM staff-guided tours may be available.

Facilities

With user fees paying part of the cost, the BLM upgraded parking and restroom facilities in 1999 and 2000. In 2002, after monument designation and to accommodate increased visitation, the agency expanded the parking areas. By popular demand indicated in two recreation surveys (one administered by the BLM Albuquerque District and the second by the BLM Washington Office), trash receptacles, picnic tables and group shelters were added to provide visitors with a welcome rest area after hiking.

Also in 2002, the agency improved and graveled the 5-mile access road to the parking area and trailhead, in part to reduce dust at the Pueblo de Cochiti. In 2003, the agency improved and upgraded an additional 3.5 miles of road to the Scenic Overlook, located near the western boundary of the monument.

TABLE 3-4

**FEES COLLECTED AT NATIONAL MONUMENT, FISCAL YEARS 1998-2004,
WITH FUNDS CONTRIBUTED FOR BLM FACILITIES DEVELOPED & OPERATIONS BY
THE PUEBLO DE COCHITI**

Fiscal Year	Total \$\$ Collected	BLM Facilities Developed or Improved	Cochiti Operations Funded (\$\$)
1998	12,165	Entrance gate, brochures, universally accessible vault toilet	3,041
1999	20,035	Parking area improvements, picnic tables & trash receptacles	5,008
2000	22,938	Picnic tables, NRT improvements ^a , brochures	8,028
2001	26,502	Shade shelters for picnic tables, brochures	9,276
2002	36,856	Second vault toilet, benches, portal sign, brochures	12,899
2003	45,924	Split rail fencing, informational signs, brochures	16,073
2004	44,958	NRT improvements to ADA (universal design & access) standards ^a , benches, Scenic Overlook improvements, brochures	15,735

Note: ^a NRT—National Recreation Trail; ADA—Americans with Disabilities Act

Road improvements included concrete low-water crossings, improved signage for vehicles, dust abatement, and a small parking area at the overlook.

The BLM has installed a steel gate approximately ¼ mile west of the Scenic Overlook access road (BLM Road 1011/Forest Service Road 266). This road connects with State Road 290, which passes through the town of Ponderosa and connects to State Road 4 at Jemez Pueblo. The high-clearance portion of Forest Service Road 266, which is dirt, traverses the Santa Fe National Forest and a portion of the Jemez Pueblo Reservation. Jemez Pueblo has an access gate adjacent at the western boundary of the national monument, and a U.S. Forest Service access gate is located near Ponderosa (about 20 miles west of the national monument boundary). The BLM and Jemez Pueblo coordinate seasonal road and gate closures (during the winter months and extreme fire conditions) with the Forest Service, Jemez Ranger District.

As outlined in BLM Environmental Assessment NM-010-2003-036, the BLM is completing or planning the following additional improvements: developing a water well to supply domestic drinking water for the main parking and picnic facilities, and installing a vault toilet and possibly a picnic facility near the Scenic Overlook.

A dedication of the Scenic Overlook as a Veterans' Memorial was held on April 3, 2004, honoring all veterans. A cast bronze commemorative plaque will be installed at the overlook.

Economic Benefits

The BLM is considering additional facilities or programs at the monument that could provide economic benefits and career opportunities for the Pueblo de Cochiti. These include the following.

- Paving the 5-mile access road (Tribal Route 92) to reduce dust and improve safety at the pueblo.

- Pueblo de Cochiti Youth Career Development Program.
- Pueblo de Cochiti Law Enforcement /Public Safety Officer Program.
- Information/Fee Collection Station

Additionally, the BLM and several federal, county and state agencies signed a Memorandum of Understanding with the Pueblo de Cochiti to continue discussions about the design, construction and maintenance of a Monument Visitor/Cultural Center. The center will be built on pueblo land and leased by various agencies or supported by in-kind services.

Private Inholdings within the Monument

Approximately 760 acres of private inholdings are located within the monument boundary. Hikers often venture onto the private land to complete a loop that uses the National Recreation Trail as the starting point. The BLM has posted signs at the NRT trailhead and at strategic points along the trail informing the public about the private land boundaries. These boundaries are also outlined on a map at the kiosk. The landowners have fenced off a portion of their property and posted private land signs.

RIPARIAN AREAS

The term “riparian” refers to a unique area that represents the transition between permanently saturated wetlands and drier uplands. These areas have vegetative or physical characteristics that reflect the influence of permanent surface or subsurface water. Lands along, adjacent to, or connected with rivers and streams with stable water levels are typical of riparian areas.

Not all areas along stream channels (streamside zones) develop into riparian areas. Lack of soil, climatic variables, and wide variation in stream-flow, geology, or use-related factors can limit the creation or maintenance of a riparian area. The shorelines of the Peralta Canyon stream channel within the national monument (approximately 2.05 miles) may not support

riparian vegetation because flow is intermittent (occasional); the area may also lack the subsurface water needed to support such vegetation.

The soils in the Peralta Canyon streamside zone develop from flood-deposited sediments. Managing Peralta Canyon for possible riparian area development within the monument boundary will require the BLM to coordinate agency efforts with adjacent private landowners.

SOCIAL AND ECONOMIC CONDITIONS

For purposes of social and economic analysis, no population resides in the monument itself. The monument lies within U. S. Census Tract 103.01 in Sandoval County, New Mexico, and makes up only 2.16 percent of the tract’s 250,010 acres. Table 3-5 lists numbers and the range of income for the major population groups within 5 miles east and south of the monument boundary (Census Tract 9401).

Few of the income dollars stay within the local community because the trade centers of Santa Fe and Albuquerque draw away much of the spending. However, some of this income is spent in Bernalillo and Rio Rancho, and remains within Sandoval County for one round of spending before it moves on.

Sandoval County has a population of 89,908 by 2000 census figures, or approximately 4.9 percent of New Mexico’s 2000 census total of 1,819,046. Almost a third (32 percent) of the county’s population is under 25 years of age, while the state has 31 percent in this age group. For those 65 years and older, the figures are 11 percent for the county and 12 percent for the state.

At the regional level, Sandoval County is combined with Bernalillo and Santa Fe Counties for statistical purposes. This region includes nearly 5.6 percent of New Mexico’s acreage and over 42 percent of the state’s population. Table 3-6 shows comparative population and economic information.

The regional population growth (2.1 percent per year) between 1990 and 2000 was slightly higher than that for the state (2.0 percent). The median age for the regional counties, ranging from 35.0 to 37.9 years (especially in Santa Fe County), is higher than for New Mexico at 34.6 years. Minorities in the region include American Indian and Hispanic or Latino at 5.4 percent and 41.7 percent respectively, compared to 9.5 and 42.1 percent respectively for New Mexico. Except for Sandoval County, both owner- and renter-occupied household size was smaller in the region than in New Mexico. Vacant housing units were only 8.1 percent in the region, compared to 13.1 percent in New Mexico. Owner-occupied units were 61.2 percent of all units in the region, compared to 60.8 percent in the state. Renter-occupied units were 30.7 percent for the region, compared to 26.1 percent for New Mexico.

The labor force in the region totals 442,183 (*New Mexico Labor Market Report* Volume 33, No.6, July 31, 2004) with a current unemployment rate of 5.3 percent. Wage and salary jobs in the region account for 83.1 percent of the jobs (refer to Table 3-7 for comparative employment figures). Proprietor's jobs account for the other 16.9 percent. Comparable figures for New Mexico are 80.88 percent and 19.51 percent respectively. Services (health, legal, business, other) account for 35.0 percent of the jobs in the re-

gion. Retail trade at 17.7 percent and government at 16.5 percent are the other leading sectors. Comparable figures for New Mexico are 31.3 percent services (health, legal, business, other), 19.5 percent government, and 17.8 percent retail trade. The 1970 to 2000 new job figures for the counties making up the region show the greatest growth in the services sector (health, legal, business, other) at 39.51 percent, compared to 39.05 percent for New Mexico.

In the three-county region, new income in the services sector (health, legal, business, and other) grew more than all other sectors in the region. However, the 26.21 percent increase was far below the 39.51 percent job increase in the state. The per-capita income growth in the region between 1970 and 2000 was from approximately \$13,930 to approximately \$24,530, just over a 76 percent increase. Table 3-8 shows comparative income figures. [Note: Factors affecting the value of the dollar have not been considered.]

Under an agreement with the BLM, the Pueblo de Cochiti receives annual funding of \$25,000 plus 35 percent of the visitor fees collected to care for and maintain the monument facilities. Currently this involves part-time employment for four persons that amounts to approximately \$40,000 per fiscal year.

TABLE 3-5

**2000 CENSUS INFORMATION FOR POPULATIONS
NEAR THE MONUMENT**

Census Block Group, Tract 9401	Total Population	No. (%) of Persons Listing Selves as "American Indian & Alaska Native Alone"	Household Income	
			No. of Families w/≤\$10,000	No. of Families w/>\$100,000
1	394	26 (.07)	4	16
2 ^a	507	483 (95.27)	21	3
3 ^b	601	186 (30.95)	16	11
Total	1,502	695 (46.27)	41	30

Notes: ^a Includes the Pueblo de Cochiti.

^b Includes the Village of Cochiti Lake.

TABLE 3-6

POPULATION & ECONOMIC INFORMATION, 2000

Analysis Factor	County			Region	State
	Bernalillo	Sandoval	Santa Fe		
Population (Total, Year 2000)	556,678	89,908	129,292	775,878	1,819,046
% Change/Year, 1990-2000	1.6	4.2	3.1	2.1	2.0
Under 20 Years Old (%)	1.3	3.3	2.1		1.5
65 Years Old and Over (%)	2.7	4.9	3.8		3.0
Median Age	35.0	35.1	37.9		34.6
<u>Population by Race (%)</u>					
White	70.8	65.1	73.5		66.8
Black	2.8	1.7	0.6		1.9
Other	22.2	16.9	22.8		21.8
Hispanic or Latino (of any Race)	42.0	29.4	49.0		42.1
Not Hispanic or Latino	58.0	70.6	51.0		57.9
<u>Population by Household Type</u>					
Total Housing Units	239,074	34,866	57,701	331,641	780,579
Vacant Housing Units	18,138	3,455	5,219	26,812	102,608
Owner-Occupied Units	140,634	26,257	35,985	202,876	474,445
Renter-Occupied Units	80,302	5,154	16,497	101,953	203,526
<u>Average Household Size</u>					
Owner-Occupied	2.6	2.9	2.6		2.7
Renter-Occupied	2.2	2.5	2.1		2.4

TABLE 3-7
EMPLOYMENT BY INDUSTRY

Type of Employment	County			Region	State
	Bernalillo	Sandoval	Santa Fe		
Total Employment	397,016	33,494	82,462	512,972	978,863
Wage & Salary	338,317	25,728	62,169	426,214	791,672
Proprietor's Employment	58,699	7,766	20,293	86,758	187,191
Farm & Agricultural Services	4,127	704	1,630	6,461	35,623
Farm	603	391	462	1,456	21,691
Agricultural Services	3,524	313	1,168	5,005	13,932
Mining	807	127	531	1,465	19,475
Manufacturing (including forest products)	21,959	N/A	2,575	24,534	48,979
Services & Professional	280,284	N/A	55,679	335,963	622,452
Transportation & Public Utilities	19,181	2,334	1,512	23,027	43,384
Wholesale Trade	18,625	N/A	1,631	20,256	33,830
Retail Trade	68,793	5,720	16,081	90,594	174,030
Finance, Insurance & Real Estate	31,857	2,207	7,040	41,104	64,774
Services (Health, Legal, Business, Other)	141,828	8,573	29,415	179,816	306,434
Construction	25,675	2,557	5,814	34,046	61,668
Government	61,164	4,022	16,233	84,419	190,666

TABLE 3-8

INCOME BY TYPE
(in millions of Year 2000 dollars)

Type/Source of Income	County			Region	State
	Bernalillo	Sandoval	Santa Fe		
Farm & Agricultural Services	68	4	23	95	82
Farm	7	2	4	13	-56
Agricultural Services	61	3	18	82	139
Mining	13	3	18	34	130
Manufacturing (including forest products)	904	N/A	73	977	1,278
Services & Professional	7,696	N/A	1,413	9,109	9,651
Transportation & Public Utilities	723	81	50	131	856
Wholesale Trade	718	N/A	62	780	653
Retail Trade	1,233	78	315	1,626	1,478
Finance, Insurance & Real Estate	822	33	202	1,057	974
Services (Health, Legal, Business, Other)	4,199	151	784	5,134	5,690
Construction	862	93	188	1,143	1,086
Government	2,686	127	585	3,398	3,715
Non-Labor Income	4,765	572	1,403	6,740	10,515
Dividends, Interest & Rent	2,904	310	1,030	4,244	5,687
Transfer Payments	1,862	261	374	2,497	4,828
Total Personal Income	15,190	2,019	3,886	21,095	39,943
Non-Farm Income	15,183	2,017	3,882	21,082	39,370
Farm Income	7	2	4	13	573
Per-Capita Income (in thousands)	27,253	22,247	29,949	24,531	21,931

SOILS

The Soil Survey of Sandoval County Area, New Mexico delineates eight soil map units within the Kasha-Katuwe Tent Rocks National Monu-

ment. Based on their position on the landscape, these can be generally grouped into valleys, mesa tops and fan terraces, and steep mesa side-slopes, as shown in Table 3-9 below and on Map 4 (in the map section of the document).

TABLE 3-9

SOILS IN THE KASHA-KATUWE TENT ROCKS NATIONAL MONUMENT/DECISION AREA
(refer also to Map 4 in the map section)

Landscape Position, Soil Map Unit Name	Soil Map Unit No.	Decision Area Acres ^a	Landforms & General Location	Depth	Surface/Subsurface Textures	Permeability	Hazard of Water Erosion	Vegetation	Parent Material ^b	Inclusion(s)	Other Information
<u>Valleys</u> Waumac-Bamac Association, 1-7% slopes	300	498.4	<ul style="list-style-type: none">• Waumac—Valley floors & toe slopes• Bamac—Along bottom of Peralta Canyon	Deep (both)	<ul style="list-style-type: none">• Waumac--loamy sand over fine sandy loam & gravelly fine sandy loam subsoil• Bamac--gravelly loamy sand over very gravelly loamy sand & very gravelly coarse sand subsoil	Moderately rapid to very rapid (both)	Moderate (both)	<ul style="list-style-type: none">• Current—piñon & juniper trees• Historical—riparian ecosystem in selected areas ^c	<ul style="list-style-type: none">• Waumac—alluvium from sandstone & igneous rocks• Bamac—mixed alluvium	River wash in arroyo channels; small areas of Royosa soils on rolling fan terraces	Well-drained (both) <ul style="list-style-type: none">• Waumac—subject to occasional flooding from snowmelt & summer storms• Bamac—periodic flows w/large sediment loads from adjacent landscapes during summer storms
Totavi loamy sand, 0-5% slopes	52	8.4	Valley floors, N end, Peralta Canyon	Deep	Loamy sand to depth of 60 or more inches	Very rapid	Slight	Ponderosa pine trees w/grass understory	Alluvium from tuff & pumice	River wash	Available water capacity is moderate; SMU is subject to rare, brief periods of flooding from July through October
<u>Mesa Tops & Fan Terraces</u> Cochiti-Montecito association, 1-30% slopes	104	1,200.2	Fan terraces, W side monument	Deep (both)	<ul style="list-style-type: none">• Cochiti—gravelly loam over gravelly clay loam subsoil with very gravelly sandy loam substratum• Montecito—loam over sandy loam & gravelly sandy loam substratum	Slow to moderately slow	Moderate	Piñon & juniper trees w/grass understory	<ul style="list-style-type: none">• Cochiti—gravelly alluvium• Montecito—eolian material, colluvium, & alluvium from shale & sandstone	Cajete soils—base of some sideslopes; Waumac soils—valley floors	
Pinitos loam, 1-15% slopes	206	37.9	Fan terraces & cues-tas, NW corner monument	Deep	Loam over clay loam subsoil	Moderate	Moderate	Piñon & juniper trees w/sagebrush & grass understory	Derived from sandstone & shale	Sparham & Hickman soils on valley floors; Menefee soils on shale; Cochiti soils on terraces	
Flugle-Waumac complex, 1-8% slopes	307	452.5	<ul style="list-style-type: none">• Flugle—broad fan terraces between arroyos• Waumac—on narrow ridges & along arroyo channels, NE corner monument	Deep (both)	<ul style="list-style-type: none">• Flugle—loam over sandy clay loam subsoil• Waumac—loamy sand over fine sandy loam & sandy loam subsoil	<ul style="list-style-type: none">• Flugle—Moderate• Waumac—Moderately rapid	Moderate (both)	Mainly grasses w/overstory of scattered juniper trees (both)	<ul style="list-style-type: none">• Flugle—alluvium & eolian material derived from sandstone & shale• Waumac—alluvium from sandstone & igneous rocks	Small areas of Royosa & Fragua soils	

TABLE 3-9 (concluded)

Landscape Position, Soil Map Unit Name	Soil Map Unit No.	Decision Area Acres ^a	Landforms & General Location	Depth	Surface/Subsurface Textures	Permeability	Hazard of Water Erosion	Vegetation	Parent Material ^b	Inclusion(s)	Other Information
<u>Steep Mesa Sideslopes</u> Espiritu-Bamac association, 15-55% slopes	345	562.8	<ul style="list-style-type: none">• Espiritu—toe slopes & north-facing slopes*• Bamac—ridges & south-facing slopes*	Deep (both)	<ul style="list-style-type: none">• Espiritu—very gravelly, fine sandy loam over very gravelly, sandy clay loam subsoil• Bamac—very gravelly, loamy sand over very gravelly, loamy sand subsoil	<ul style="list-style-type: none">• Espiritu—moderate• Bamac—very rapid	Slight (both)	Mainly grasses & shrubs w/widely scattered juniper trees	Mixed alluvium (both)	Waumac soils—toe slopes & valley floors; Cochiti soils—valley sides; rock outcrop—escarpments & ledges	*Includes main Tent Rocks cliffs (N side of monument) & two other areas (flanking SE & SW sides of Peralta Canyon, w/few rock outcrops)
Cochiti-Espiritu association, 15-55% slopes	353	2,641.7	<ul style="list-style-type: none">• Cochiti—north-facing slopes**• Espiritu—south-facing slopes**	Deep (both)	<ul style="list-style-type: none">• Cochiti—extremely gravelly loam over very gravelly clay loam subsoil• Espiritu—very gravelly loam over very gravelly, sandy clay loam subsoil	<ul style="list-style-type: none">• Cochiti—slow• Espiritu—moderate	Slight on slopes <35%, high on slopes >35% (both)	Mainly piñon & juniper trees w/understory of grasses	<ul style="list-style-type: none">• Cochiti—alluvium• Espiritu—alluvium & colluvium	Small areas of Waumac soils—valley sideslopes; Teco soils—broad ridges	**Largest SMU in monument; occurs on most slopes flanking Peralta Canyon
Laventana-Mirand very cobbly loam, 15-55% slopes	603	36.9	Mountain slopes; small steep area in NW corner monument	Deep (both)	<ul style="list-style-type: none">• Laventana—very cobbly silt loam• Mirand—very cobbly loam over cobbly clay subsoil	<ul style="list-style-type: none">• Laventana—moderate• Mirand—very slow	Slight (both)	Mainly ponderosa pine w/scattered Douglas fir, alligator juniper & piñon trees, w/understory of grasses & shrubs	<ul style="list-style-type: none">• Laventana—alluvium & colluvium derived from andesite & granite• Mirand—colluvium derived from rhyolite & tuff	Small areas of Cypher soils—summits; Totavi soils—valley floors; rock outcrop—escarpments & ledges; Cajete soils—mountain slopes	

Notes: ^a Acreage includes private and state land within Decision Area boundaries.

^b Technical terminology is defined in the Glossary (in the back of the document).

^c Area still contains remnants & artifacts of riparian vegetation that indicate the potential for reestablishing a riparian ecosystem in selected areas.

THREATENED, ENDANGERED, AND SENSITIVE WILDLIFE SPECIES

Federally Listed Species

The U.S. Fish and Wildlife Service (FWS) has identified six federally listed threatened or endangered (T&E) and candidate wildlife species as possibly occurring in Sandoval County, New Mexico (refer to the correspondence in Appendix F). These species are described in Table 3-10. In addition to the federally listed species, those species considered sensitive by BLM, state wildlife agencies, or tribal governments and potentially occurring within the national monument have been evaluated for this RMP (refer to Appendix G). Those species identified as having potential for occurrence in the national monument are listed in Table 3-11 below.

In accordance with Section 7 of the Endangered Species Act, BLM staff biologists have prepared a Biological Evaluation to determine the potential for impacts to the six federally listed T&E species identified as potentially occurring in the national monument. Data sources include federal, state, and tribal agencies, the Biota Information System of New Mexico (BISON-M), and field surveys conducted by BLM biologists. Detailed species descriptions of these species' life history, status, distribution, and potential for occurrence are presented in the Biological Evaluation, which is on file at the Rio Puerco Field Office.

BLM biologists conducted field surveys to determine the presence of suitable habitat for T&E wildlife species within the monument. However, because of the land ownership patterns and the specific habitats used by these species, they may occur within Sandoval County but not specifically on federal lands within the national monument. The potential for these species' presence and their habitats within the area are examined in Table 3-10, while potential impacts on them resulting from implementing the various alternatives are discussed in Chapter 4. Of the six federally listed T&E species identified as potentially occurring in Sandoval County, none has been identified as being present or having suitable habitat within the national monument.

Sensitive Species

As part of the analysis for this RMP, BLM biologists consulted the lists of sensitive species maintained by the BLM, Navajo Tribe, State of New Mexico, U.S. Forest Service (USFS), and FWS to determine both the potential presence of sensitive species and any potential impacts from implementing the actions identified in the RMP. In addition to the six federally listed species discussed above, 45 state-listed species, sensitive species, and species of special concern, as well as BLM and USFS sensitive species were evaluated. Of the 52 species evaluated, 13 are either present or have suitable habitat within the monument. The 13 species include nine mammals and four birds, as listed in Table 3-11 below.

VEGETATION

Major Land Resource Area

The Natural Resources Conservation Service (NRCS) has developed descriptive classifications of Major Land Resource Areas (MLRAs), which are large regions that represent nearly homogeneous areas of soil, climate, land use, water resources, elevation, topography, and potential natural vegetation. The Decision Area lies within MLRA No. 36; Western Plateau (WP-2), New Mexico and Arizona Plateaus and Mesas.

The WP-2 MRLA consists of broad mesas and plateaus interspersed with numerous deep canyons and dry washes, mesa breaks, and canyon walls. Scattered throughout the region are isolated volcanic peaks, cones and lava flows. It is characterized as semi-arid, with distinct seasonal precipitation and temperature patterns associated with a continental climate. Average annual precipitation approaches 10 to 16 inches.

The soils and climate contribute to a vegetative community of grasslands and mixed shrublands. At upper elevations are piñon-juniper woodlands characterized by alligator juniper, oneseed juniper, shrub live oak, bullgrass, little bluestem, piñon ricegrass, and blue grama.

TABLE 3-10

**FEDERALLY LISTED THREATENED, ENDANGERED & CANDIDATE WILDLIFE SPECIES
THAT MAY OCCUR IN SANDOVAL COUNTY**

Species Names, Common & Scientific	Status^a	Range & Habitat Association	Potential for Occurrence in Decision Area
bald eagle— <i>Haliaeetus leucocephalus</i>	T	Throughout the monument, bald eagles may be present as migrants or wintering birds. While no known nesting sites have been identified within the monument, potential nesting habitat is limited to riparian habitat along the Rio Grande. Riparian areas & wetlands are primary habitat for winter roost areas & during migration.	None. No suitable habitat in monument.
black-footed ferret— <i>Mustela ni- gripes</i>	E	Historically reported from all but the southernmost part of New Mexico (i.e., the area south of the Mogollon Plateau east of the Pecos Valley). Last confirmed sighting in 1934. Suitable habitat consists of black-tailed prairie dog colonies or complexes (80 acres or greater) or Gunnison's prairie dog colonies or complexes (200 acres or greater).	None. No suitable habitat in monument. Species is presumed extirpated from New Mexico.
Mexican spotted owl— <i>Strix occiden- talis lucida</i>	T	In New Mexico, reported in several counties, including San Juan, Sandoval, McKinley, Bernalillo, Torrance, Lincoln, & Eddy. Found primarily in canyons, mixed conifer forests, pine-oak woodlands & riparian areas. Nests on platforms & large cavities in trees, on ledges, & in caves.	None. No suitable habitat in monument.
Rio Grande silvery minnow— <i>Hybognathus amarus</i>	E	Occurs in a variety of habitats in the Rio Grande with shifting sand or silty bottoms. Perennial stretches of the river between the Santo Domingo Pueblo (Sandoval Co.) & Socorro are critical habitat.	None. No suitable habitat in monument.
Southwestern willow flycatcher— <i>Empidonax trailli extimus</i>	E	In New Mexico, reported in several counties, including San Juan, Sandoval, McKinley, Bernalillo, Torrance, Lincoln, & Eddy. Found primarily in canyons, mixed conifer forests, pine-oak woodlands & riparian areas. Nests on platforms & large cavities in trees, on ledges, & in caves.	None. No suitable habitat in monument.
Western yellow-billed cuckoo— <i>Coccyzus americanus</i>	C	Known to occur throughout Wyoming & New Mexico. Potential habitat defined as open woodlands, streamside willow & alder groves. Mature riparian woodlands along the Rio Grande may provide suitable habitat.	None. No suitable habitat in monument.

Note: ^a T—Threatened, E—Endangered, C—Candidate.

TABLE 3-11
SENSITIVE WILDLIFE SPECIES
WITH POTENTIAL TO OCCUR IN THE DECISION AREA

Species Names, Common & Scientific	Status ^a	Range & Habitat Association	Potential for Occurrence in Decision Area
<u>Birds</u> ferruginous hawk — <i>Buteo regalis</i>	FWS, BLM, USFS, NESL Group3	In New Mexico, occurs primarily as a rare to uncommon transient & winter migrant statewide. Breeding is less common in New Mexico. Nest sites include trees, ledges, large rock outcrops, & low cliffs in sagebrush valleys & rolling grasslands.	Possible but unlikely as the result of marginal nesting & foraging habitat. No sightings documented in Decision Area.
American peregrine falcon— <i>Falco peregrinus anatum</i>	FWS, BLM, NM-T, NESL Group 4	In New Mexico, breeds locally in mountain areas & migrates statewide. Nests are often located on cliff faces with overhanging ledges or rock outcrops.	Possible but unlikely as the result of marginal nesting & foraging habitat. No sightings documented in Decision Area.
gray vireo— <i>Vireo vicinior</i>	NM-T	In New Mexico, recorded in the Guadalupe & San Andres Mountains., the San Juan River Valley, Navajo Lake, & in the vicinity of Santa Fe. Records for the Sandia & Manzano Mtns. include only rare transients. Uses upland habitats in desert canyons, foothills, & open woodlands.	Could occur within suitable habitats in Decision Area, but habitat is marginal. No sightings documented in Decision Area.
loggerhead shrike — <i>Lanius ludovicianus</i>	FWS, BLM	Widespread summer resident in New Mexico, & known to occur throughout the state. Primary habitat is open country interspersed w/pastures, grasslands, & hedgerows below 9,000 feet. Nesting habitat includes sagebrush areas, desert scrub, piñon-juniper woodlands, & woodland edges.	Could occur within suitable habitats in Decision Area.
<u>Mammals</u> Western small-footed myotis— <i>Myotis ciliolabrum melanorhinus</i>	FWS, BLM	In New Mexico, known to occur throughout much of the state. Found in woodlands, forests, & desert communities. Known to roost in caves, abandoned buildings, under rocks, in crevices, & under pine bark. Occurs at elevations between 5,200 & 7,050 feet.	Could occur in Decision Area. Impacts are unlikely, but large, dead, standing ponderosa pines that are not a hazard will be left in place.
Yuma myotis— <i>Myotis yumanensis</i>	FWS, BLM	Known to occur in Sandoval, Rio Arriba, & Chaves Counties. An uncommon seasonal visitor to desert, grassland, woodland, & riparian areas from 4,000 to 7,000 feet. Known to roost in buildings, caves, & crevices.	Could occur within suitable habitats in Decision Area, although roosting habitat is marginal.
little brown myotis— <i>Myotis lucifugus carissima</i>	NM-S	Known to occur in Sandoval County. Known roost sites in buildings.	Possible but unlikely as the result of marginal roosting & foraging habitat.

TABLE 3-11, concluded

Species Names, Common &Scientific	Status ^a	Range & Habitat Association	Potential for Occurrence in Decision Area
Mammals, concl'd Occult little brown bat— <i>Myotis luci- fugus occultus</i>	FWS, BLM	Widely distributed throughout western & central New Mexico, & known to occur in McKinley & Sandoval Counties. Uses riparian habitats associated w/permanent water sources such as streams, drainage ditches, & lakes. Also are known to roost in human-made structures, caves, tunnels, & hollow trees, including piñon-juniper, ponderosa pine & mixed conifer forests. Most common at higher elevations between 6,000 & 9,000 feet.	Possible but unlikely as the result of lack of riparian habitat in Decision Area.
long-legged myotis— <i>Myotis volans interior</i>	BLM, NM-S	Known to occur throughout New Mexico. Habitat usually ponderosa pine & higher elevations.	Possible but unlikely. Decision Area below species' normal habitat elevation.
long-eared myotis— <i>Myotis evotis</i>	FWS, BLM	Found throughout western New Mexico. Uses piñon-juniper woodlands & coniferous forests, & roosts in caves & buildings, generally above 6,700 feet.	Could occur in Decision Area in woodlands of upper mesa areas
spotted bat— <i>Euderma macula- tum</i>	BLM, USFS R3, NM-T	Known to occur in Sandoval & Rio Arriba Counties. Typical habitat includes rocky areas near perennial water & other habitats including riparian, piñon-juniper woodlands, & ponderosa pine. Roosts in crevices in cliffs or under large loose rocks.	Possible but unlikely. Roosting habitat present, but foraging habitat lacking
Townsend's big- eared bat— <i>Plecotus townsendii</i>	FWS, BLM	Fairly common in New Mexico; known to occur in Sandoval, Rio Arriba, & Chaves Counties. Primarily a cave dweller; bat most dependent upon inactive mines in the southwest. Can be found in desert shrublands, piñon-juniper woodlands, coniferous forests & mixed-grass prairies. Roost in trees, caves, or human-made structures. Only subspecies of bat commonly found in New Mexico during winter.	Could occur within suitable habitats in Decision Area.
big free-tailed bat— <i>Nyctinomops macrotis</i>	FWS, BLM	Known to occur in Sandoval & Rio Arriba Counties. A summer resident that prefers coniferous to mixed woodlands, & depends on rocky cliffs for roosting. Can be found in piñon-juniper woodland, pine & mixed coniferous forests, desert grassland, & other desert communities. In addition to roosting on rocky cliffs, also may roost in caves, rock fissures, bridges, & buildings.	Could occur within suitable habitats in Decision Area.

Note: ^a FWS—U.S. Fish & Wildlife Service species of concern; BLM—BLM sensitive species; USFS—U.S. Forest Service sensitive species; NM-S—State sensitive; NM-T—State listed as threatened; NESL Group 3—Navajo Endangered Species List, Group 3—any species or subspecies that is likely to become an endangered species within the foreseeable future, throughout all or a significant portion of its range on the Navajo Nation.

Climate, Vegetation and Fire

Climate, vegetation and fire are closely interrelated. Climate (e.g., temperature, precipitation, solar degree days, growing season) is the major determinant of vegetation patterns. Fire is one part of the natural ecological processes that support, maintain and/or change a given plant community.

The potential natural plant communities within the Decision Area are highly diverse as the result of the variability of soils, elevation, annual and seasonal precipitation, temperature, degree of slope and aspect, and disturbance. Annual moisture comes primarily in the form of rainfall during the months of July, August, and September, although the amount of wintertime snow, sleet, or rain is sometimes significant. The rainfall patterns generally favor warm-season perennial vegetation, while the temperatures tend to favor cool-season vegetation, creating a complex community of plants on any given ecological site. This community is quite susceptible to disturbance, and is at or near its productive potential only when major native species of both the warm- and cool-season plants are present.

As described in the Sandoval County Soil Survey (NRCS), the potential natural plant community of woodlands and forest stands within the Decision Area consists of 70 percent piñon-juniper woodlands, 28 percent grass/shrub rangeland communities, and 2 percent ponderosa pine forests. Based on an evaluation of local fire history information (Allen 2002), the young ages of most piñon-juniper trees of the Pajarito Plateau located near Los Alamos, NM (Julius 1999, unpublished data), and soils data (McFadden 1996), it appears that many upland mesa areas now occupied by dense piñon-juniper woodlands were formerly more open, with fewer trees and well-developed herbaceous understories. These smaller plants protected the soil from excessive erosion during intense summer thunderstorms, and provided a largely continuous fuel supply that allowed surface fires to spread, thus maintaining these vegetative types.

According to meteorologists and climatologists throughout the southwest, drought conditions have existed from 1994 or 1995 to the present. This regional drought has caused trees to become moisture stressed and susceptible to insect invasion and damage. As the drought has progressed, trees have become unable to repel the piñon-bark beetle (*Ips pini*) with tree pitch. Populations of the beetle have exploded, permitting the insects to move into adjoining trees and woodlands. The beetle passes up the smaller trees (less than 3 inches in diameter) in favor of the older and larger trees, which are highly susceptible to the insect damage that eventually results in the trees' death. The extent of this outbreak within the Decision Area is obvious; on average, 88 piñon trees per acre are dead from the Ips beetle (Borland, 2004).

Noxious Weeds

Federal and state governments have legally declared more than 500 invasive plants to be "noxious weeds" (Skinner, Smith, and Rice 2000). Plants are defined as noxious weeds if they are carriers or hosts of damaging insects or diseases, or if they are overly aggressive, difficult to manage, parasitic or poisonous. Most noxious weeds are not native to the United States.

Most noxious weeds are early successional species that prefer highly disturbed sites such as those along rivers and streams, trails, trailheads, roadsides, building sites, wildlife bedding grounds, overgrazed areas, and campgrounds (Baker 1986, Sheley & Petroff 1999). Parendes and Jones (2000) have found that the presence of exotic plant species is highly correlated with sunlit soil and frequent disturbances, such as those resulting from road traffic and road maintenance activities such as grading. Chicoine (1984) has found that spotted knapweed is readily spread along transportation corridors.

Road construction and maintenance activities mix soil layers, increasing soil microbial activity. Weeds exploit these newly available

nutrients efficiently (Best, *et al.* 1980; Belcher & Wilson 1989). This may be one reason that the density of weedy plants increases with the intensity of disturbance (Jensen 1995).

One mechanism of weed seed transport is by motorized and nonmotorized vehicles (i.e., bicycles). A study in Kakadu National Park in Australia found that weed seed was transported into the park on tourist vehicles and was more likely to be transported by four-wheel-drive vehicles that had been driven off road (Lonsdale & Lane 1994). A study in California found that native plant cover and the number of species were greatest in sites farther than .6 mile from roads and least in sites 30 feet or less from roads. Conversely, noxious and invasive plant cover was greatest closer to roads (Gelbard & Harrison 2003). Vehicle undercarriages can trap and transport weed seed (Sheley & Petroff 1999). It is reasonable to believe that heavy equipment used for construction and/or maintenance that disturbs the ground would transport weed seed more readily than recreational vehicles.

In general, managing weeds has been compared to fighting fires (Dewey 1996). In both cases, the work includes prevention, early detection and control, management, and restoration. Prevention is the most effective and least expensive weed management strategy. Once a species has been introduced to a site, early detection and control or elimination is the next best plan of action. When a species has become well established in an area, the strategy must be to contain and control the infestation using integrated weed management techniques (e.g., biological control agents, herbicides, manual and mechanical means) and restoration with desirable vegetation. Small infestations outside the boundary of the main infestation should be detected early and eliminated, if possible, much as spot fires outside the main fire line are detected and put out.

The most vulnerable part of the Decision Area to weed species introduction and establishment is along the improved gravel road from Pueblo de Cochiti to the Decision Area (Tribal Route 92) and beyond to the Peralta Canyon Scenic Overlook (BLM Road 1011). Other susceptible areas include but are not limited to the public parking

area, the developed picnic grounds and trails, and the channel banks and terraces found along the Peralta Canyon stream channel. These natural and human-caused disturbances produce suitable soil seedbed for weed germination and establishment when the seeds' moisture and temperature requirements are met. Weeds may also become established where activities disturb the soil and remove the competitive natural vegetation.

Downy brome grass or "cheatgrass" (*Bromus tectorum*) is the dominant non-native, invasive species in the Decision Area. This grass occurs under most piñon-juniper trees, because the micro-climate found there, including shade and litter (organic matter and carbon), appears to favor its establishment and maintenance. It has become widespread throughout New Mexico and the Western United States, and therefore is not a high-priority weed for management because of the low likelihood of successfully controlling it. Around the piñon-juniper woodlands, downy brome establishment may be encouraged by surface-disturbing activities including but not limited to fuelwood cutting and harvest; use of haul roads or prescribed and wildland fire; and woodland thinning, lopping and scattering or shredding of tree stems and branches. No other noxious plant species have been found in the Decision Area.

As visitor days to the Decision Area increase, the area is being exposed to a higher probability of other non-native, invasive species being introduced and established. Early detection and control is vital in preventing the establishment and spread of noxious weeds. The BLM's Environmental Assessment, *Noxious Weed Management in the Upper Rio Puerco Watershed* (EA NM-010-99-038—on file at the Rio Puerco Field Office), addresses these concerns and provides for an integrated management program for noxious weed prevention and control.

Special-Status Plants

The New Mexico Rare Plant Technical Council has identified twelve plant species of concern for Sandoval County (refer to Appendix H). Sandoval County contains no federally listed

threatened or endangered plant species. Two state plant species of concern for Sandoval County could occur in the Decision Area, though neither has been identified there. These are the Santa Fe milkvetch (*Astragalus feensis*), and Santa Fe blazingstar (*Mentzelia springeri*). Santa Fe blazingstar lives in disturbed pumice soils, while Santa Fe milkvetch inhabits gravelly soils in piñon-juniper woodlands in the general vicinity of the Pajarito Plateau.

The Decision Area also contains a population of point-leaf manzanita (*Arctostaphylos pungens*), a shrubby species known primarily from the Sierra Madre of Mexico. This population is one of the northernmost in the United States and represents a unique plant adapted to the cooler and moister weather of northern New Mexico (Knight 1983). Though this species is not considered to be of special status in the state, it is noteworthy and is given special consideration in this document. This manzanita population has suffered a significant decline in recent years from the ongoing drought in New Mexico. To date, however, visitation to the monument does not appear to be adversely affecting these plants.

VISUAL RESOURCES

The Decision Area exhibits unique tuff formations for which the area is named. The cone-shaped tent rock formations are the products of volcanic eruptions from the Valles Caldera (volcanic crater) that occurred 6 to 7 million years ago and left pumice and ash deposits (forming a soft rock called “tuff”) over 1,000 feet thick. Over the last million years the tents were created by a combination of running water, wind, and mass wasting (the movement of materials down slope by creep and rockslide). Eventually this erosion cut away at the softer tuff and created tent shapes with a broad base tapering up to a point with a cap of resistant volcanic rock. “A variety of erosional landforms, besides the conical tent rocks themselves, are dramatically illustrated within the monument boundaries. The inspiring photogenic landscape of the Tent Rocks, proper, is a result of the interplay of faulting, volcanic activity, sediment deposition,

groundwater movement, and erosion and serves as an integrating attribute of the geological story” (Gary A. Smith, UNM 2/21/01).

Approximately 25 percent of the federal lands have slopes of less than 15 percent, while the majority of the lands contain steeper slopes that generally range from 15 to 55 percent, and a few acres have even steeper slopes. The cone formations are steep, with some as tall as 90 feet. Coloration is gray, white, and subtle pastel shades. Kasha-Katuwe means, “white cliffs” in the traditional Keresan language of the Pueblo de Cochiti. The “tent rock” formations extend from the private lands into the federal lands along the cliff faces in Peralta Canyon (refer to Figure 3-1).

The lower portion of the Decision Area consists predominantly of rolling hills covered with piñon and juniper trees (refer to Figure 3-2). Peralta Canyon, an intermittent (occasional) drainage through the Decision Area, provides some visual variety when flowing. Draining into Peralta Canyon and the valley bottom are small canyons and other numerous drainages. One of these, a narrow canyon on federal land with a marked trail within it, provides an excellent opportunity for the public to view the unique geologic scenery up close (refer to Figure 3-3).

From mesas within the northern portion of the Planning Area, visitors are offered views of the scenic landscape features existing on the surrounding nonfederal lands, especially those extending along the northern boundary of the monument, and on the federal land within the monument (refer to Figure 3-4). Visual contrasts exist between the lighter exposed soils on the mesa sideslopes and the darker woodland vegetation (refer to Figure 3-5). The previously dense woodland vegetation and the perceived smooth texture resulting from this density are now changing as a result of the recent drought and insect infestation that have killed high numbers of the piñon trees, resulting in less vegetative density in the Planning Area. Vegetative treatments being done to reduce the risk of wildfires are also reducing the tree density.

Through the *Rio Puerco Resource Management Plan* (RPRMP), the BLM assigned a Visual Resource Management (VRM) Class II to federal lands contained within the boundaries of the Tent Rocks Area of Critical Environmental Concern (ACEC), now the Kasha-Katuwe Tent Rocks National Monument. This classification applies to the 4,124 acres of existing federal lands within the boundary of the monument. VRM Class II was assigned to these federal lands because of their scenic quality and the sensitivity of the area's unique geological features.

Since the federal lands in the monument were assigned VRM Class II, limited management activities have taken place. The BLM has installed facilities to manage recreational use, provide resource protection and visitor convenience. The access road to and through the monument has been undergoing a series of improvements, one of which was surfacing to reduce dust and improve the air quality and visibility in the immediate area. Recreation facilities (or the "built environment") located near the tent formations include parking areas, picnic tables with shelters, restrooms and signs. The

selection and placement of colors and surface material have helped to blend the facilities into the landscape and reduce the contrasts with the basic elements of the natural features in the characteristic landscape (refer to Figures 3-6 and 3-7). Trails also have been provided for easier access to the scenic tent rock formations on federal land.

Another area undergoing development is near the northwest boundary where the BLM built a terraced scenic overlook platform in 2003 (refer to Figure 3-8). Also at this location are a defined parking area, pedestrian access from the parking area to the overlook, and landscaping. Yet to be built is a short loop trail along the edge of the mesa that would provide visitors with other viewing opportunities of the scenic landscape features contained within the monument and on nonfederal land in the Planning Area. To help increase the public's awareness of the area's visual values, the agency also is planning interpretive signs.



Figure 3-1. Tent rock formations extend along cliff faces in Peralta Canyon.



Figure 3-2. The lower portion of Decision Area consists primarily of rolling hills with piñon and juniper trees.



Figure 3-3. Visitors on a narrow canyon trail have opportunities to view the Tent Rocks up close.



Figure 3-4. Visitors to the northern portion of the area can view landscape scenery on nonfederal lands.



Figure 3-5. Darker woodland vegetation offers contrasts with lighter soils on mesa sideslopes.



Figure 3-6. Visitor facilities near the tent formations blend in with the landscape.



Figure 3-7. The selection and placement of colors and surface material in visitor facilities reduce contrasts with the landscape.



Figure 3-8. The terraced scenic overlook platform near the northwest boundary of the Decision Area offers viewing opportunities to visitors.

WATER RESOURCES

The presence of surface and groundwater in an area depends on the local and regional climate (discussed below) and landforms. In the Decision Area, the landforms consist of hill slopes and ridgetops, rolling plateaus, alluvial fans, and stream channels and their flood-prone areas.

Climate

Records at nearby Cochiti Dam indicate an average annual precipitation of 12.1 inches. For the years 1975 through 2004, the average monthly and annual precipitation amounts at the dam are as shown in Table 3-12 (Western Regional Climate Center 2004).

TABLE 3-12
AVERAGE PRECIPITATION AT COCHITI DAM,
1975-2004
(inches)

Time Period	Average Precipitation
January	0.61
February	0.45
March	0.68
April	0.75
May	1.00
June	0.93
July	1.64
August	2.02
September	1.38
October	1.15
November	0.87
December	0.61
Yearlong	12.10

In the winter and spring months, precipitation may fall as either rain or snow. Most annual moisture comes from thunderstorms during July through September.

Surface Water

No perennial streams, springs, or seeps lie within the Decision Area boundaries. Surface water flows may occur at various times of year from thunderstorms, frontal system rainfall, and melting snow.

Peralta Canyon is the principal stream channel within the Decision Area boundaries. Colle

Canyon, a major tributary to Peralta Canyon, joins it near the northern boundary of the Decision Area. Both streams have their headwaters in the higher terrain of the Santa Fe National Forest to the north, and accumulate an annual snowpack there. Thus, Peralta Canyon within the Decision Area may experience sustained periods of snowmelt runoff from the higher terrain, though no records of streamflow have been kept.

Most of the Decision Area drains directly into Peralta Canyon from local watersheds of less than 2 square miles in size. Brief streamflows occur in the small watersheds after sufficiently large rainstorms or snowmelts. At the Decision

Area's southern boundary, the total watershed area drained by Peralta Canyon measures 38.6 square miles (24,687 acres) in size.

Throughout the Decision Area, Peralta Canyon is designated by the Federal Emergency Management Agency as a "special flood hazard area inundated by 100-year flood," with "no base flood elevations determined." [This designation is shown on the agency's insurance rate maps (FEMA 1996).]

Groundwater

The occurrence and quality of groundwater aquifers in the vicinity of the Decision Area are not well understood. Potentially, two types of groundwater recharge areas exist: (1) areas where streamflows seep into channels, and (2) areas with greater precipitation amounts (i.e., in the higher elevations to the north and west).

The BLM has recently investigated using groundwater for a drinkable water supply in the Decision Area. In 2003, a drilling attempt near the lower trailhead was unsuccessful in finding water to a depth of 525 feet, where drilling was suspended. Three other known wells within a mile of this location showed variability in ground water depth and quality (USDI, BLM 2001).

Water Quality

The quality of the surface water in the Decision Area has not been characterized because of its intermittent (occasional) or ephemeral (temporary) nature. The Decision Area (including Peralta Canyon) is within the Rio Grande-Santa Fe Watershed (HUC 13020201) of the U.S. Geological Survey's eight-digit Hydrologic Unit Code watershed classification system. The state has identified no water quality problems for either the Decision Area or Peralta Canyon in the *2004-2006 Integrated Clean Water Act 303(d) 305(b) Report* (New Mexico Environment Department 2004).

The BLM protects water quality by following Best Management Practices (BMPs). (Refer to Chapter 2, "Soil and Water Resources," in the

section entitled, "Management Guidance Common to All Alternatives" for a definition of BMPs for water resources management.) These practices are used when carrying out projects on public (federal) land to help ensure that water quality is maintained, and not degraded by events such as erosion that add sediment to the water. Activities in the Decision Area that have been carried out using these practices include the restoration of small areas (e.g., unused/unneeded roadbeds), addition of infrastructure (e.g., road widening; parking lots, trails, and visitor facilities), and retrofitting of facilities (e.g., trail relocation—USDI, BLM 2003).

WILDLIFE

General

The Kasha-Katuwe Tent Rocks National Monument is located on the lower slopes of the Pajarito Plateau and the southeast edge of the Southern Rocky Mountains physiographic province. The Pajarito Plateau harbors a diversity of animal species and communities, reflecting the wide variety of available habitats. The interfingering of deep, steep-sided canyons with narrow mesas that descend the east slopes of the Jemez Mountains and an inversion of the normal distribution of vegetation communities along the canyon floors result in many transitional overlaps of plant and animal communities and increased biological diversity. This dominant feature of the Pajarito Plateau, in combination with a descent of almost 1 mile in elevation from mountain ridges to the Rio Grande, has been the primary contributor to the richness and diverse ecological relationships of the species that characterize the plateau.

The Pajarito Plateau contains six vegetation zones, including montane grasslands, spruce-fir forest, mixed-conifer forest (with aspen forest), ponderosa pine forest, piñon-juniper woodland, and juniper savannah. The montane grassland, spruce-fir, and mixed conifer vegetation zones are located primarily west of the monument, with little representation inside it. These vegetation zones and their associated transition areas provide habitat, including breeding and foraging

territory, and migration routes for a diversity of permanent and seasonal wildlife species.

The animals of the Decision Area have not been surveyed, but it is situated within 10 miles of Bandelier National Monument and Los Alamos County which have been extensively surveyed and share the Decision Area's same ecosystems. Bandelier National Monument surveys indicate the presence of approximately 1,200 arthropod species, 5 amphibians, 14 reptiles, 44 terrestrial mammals and 12 bats. About 115 breeding bird

species and 90 species of ants have been recorded in nearby Los Alamos County. No fish species are found within the Decision Area's boundaries. However, 12 species of fish are found in the nearby Rio Grande, Cochiti Lake, and the Rito de los Frijoles. A native population of Rio Grande cutthroat trout is located in the headwaters of Peralta Canyon approximately 10 miles up stream from the Decision Area. The numbers of wildlife species found in the Decision Area are shown in Table 3-13 below.

TABLE 3-13
NUMBERS OF WILDLIFE SPECIES FOUND IN THE DECISION AREA
BY HABITAT TYPE

Category of Animal	No. of Species in Habitat Type	
	Woodlands & Savanna	Sideslopes & Cliffs
Amphibians	4	0
Reptiles	34	32
Big game (mammals & birds)	5	1
Smaller game birds	2	2
Raptors	9	9
Birds of conservation concern	17	17
Breeding birds	38	6
Neo-tropical migratory birds	57	57
Small mammals	66	66

Habitat types within the boundaries of the Decision Area are somewhat limited because of the area's small size and location on the lower slopes of the Pajarito Plateau, as well as a lack of open water. Decision Area habitats are developed within vegetation communities that range from a oneseed juniper savanna at the bottom of Peralta Canyon to ponderosa pine-piñon-juniper woodland on the upper mesas, and a mountain mahogany-live oak shrubland on the canyon sideslopes.

However, the strong vertical arrangement of the area has lead to a variety of special habitats. These include canyon-effect ponderosa pine stringers, and cliff areas around the tent rock formations. The current drought and resultant beetle infestation have lead to a near total die-off of lower elevation ponderosa and piñon pine trees, altering the lower slope and canyon bottom habitat to a more open juniper-desert shrub savanna. This shift away from a young invasive woodland should change the associated wildlife

species composition to include more desert grassland species, with a resultant increase in the area's biodiversity.

BLM wildlife management activities are currently directed by the *Final Protection Plan for Tent Rocks, an Area of Critical Environmental Concern* (1987). The Protection Plan's management goals and objectives (prescriptions) for wildlife are carried forward into this RMP, including protecting habitat for nongame birds, improving big game winter habitat, and providing water development. Actions already implemented that relate to these prescriptions include the construction of a large rainwater catchment, ripping of meadows to promote the growth of grass, and closing roads in Section 31, T. 17 N., R.4 E.

The BLM recognizes that the states are largely responsible for managing resident wildlife species, and the Department of Agriculture's Animal and Plant Health Inspection Service-Animal Damage Control (APHIS-ADC) has federal authority for carrying out animal damage management programs on public (federal) lands. APHIS-ADC cooperates with the BLM to identify areas where mitigation or restriction may be needed to comply with the BLM's land use plans. All special management areas within the Albuquerque Field Office boundaries (including the national monument) have been identified to APHIS-ADC as restricted, and as public safety zones where predator management activities should not occur. (However, these activities may occur at landowners' request on the private and state inholdings within monument boundaries.)

Game Animals

The BLM supports management plans of the New Mexico Department of Game and Fish (NMDG&F) for those species that state law defines as of economic value (game animals). The national monument is on the boundary between Big Game (hunting) Units 6A and 6C. Big game species are an important aesthetic and economic resource in New Mexico. Big game

species of interest in the area include mule deer, elk, black bear, cougar, and turkey. The monument is considered to be primarily wintering habitat for a portion of the Jemez elk and deer herds. Therefore the actual number of deer and elk occupying the area fluctuates widely during the year and with the severity of winter weather. The monument is rapidly being surrounded by urban development, so its importance as an open area for big game winter habitat is growing. The current road density in the monument is approximately .6 miles of road per square mile, which is near the optimal .5 miles per square mile for big game winter range.

Bighorn sheep occupied the White Rock Canyon portion of the Pajarito Plateau until the 1880s. This historical habitat occurs on land now part of Bandelier National Monument, Santa Fe National Forest, Los Alamos National Laboratory, San Ildefonso and Santa Clara Pueblos, and on private land. The NMDG&F estimates the area could potentially support approximately 125 bighorn, but currently has no scheduled plans for a reintroduction. Though habitat within the boundaries of the monument is extremely marginal, bighorns reintroduced onto the Pajarito Plateau could potentially move there in the long-term future.

Mourning doves are the most common upland gamebird species in the area. They do not occur in high densities in the area and do not attract much hunter attention.

Waterfowl use of the area is severely limited by the ephemeral (temporary) nature of the streamflows in Peralta Canyon. These birds make only transient use of the area's few dirt dams when they contain water.

Nongame Animals

Other vertebrate species of high federal, state, or public interest include special-status species of amphibians, rodents, reptiles, raptors, and neotropical migratory birds (refer to the section above on Threatened, Endangered and Sensitive Species).

Reptiles and Amphibians

The area's lack of open water severely limits its habitat for amphibians, which require wetland sites for at least part of their life cycle. In the Decision Area, these sites are limited to ephemeral rainwater collection areas such as dirt tanks and depressions in rocks. The amphibian species known to occur in the vicinity of the Decision Area include the red spotted toad, New Mexico spadefoot toad, Woodhouse's toad, and tiger salamander. Little knowledge exists concerning most of these species in the monument.

Reptiles generally prefer dense brush or rocky areas, which are found in abundance in the Decision Area. Small lizards are the wildlife most likely to be encountered by visitors to the monument. Thirty two species of reptiles are found in the Decision Area's habitat types. Common reptiles that may be found in the area include eight species of lizard (collared, leopard, earless, roundtail horned, mountain short-horned, Eastern fence, side-blotched, and whip-tail); and five species of snakes (coachwhip, garter, gopher, Western diamondback, and Western rattlesnake).

Raptors

The Peralta Canyon area contains an abundance of raptor habitat, ranging from valley bottoms to cliffs and woodlands. Rocky cliffs and ledges along the sides of Peralta and Colle Canyons provide nesting sites for raptors (birds of prey). The most common species in the area include the sharp-shinned hawk, Cooper's hawk, red-tailed hawk, kestrel, marsh hawk, and golden eagle. Ravens and jays are also common. Bald

eagles are occasionally seen flying over Peralta Canyon because of its proximity to Cochiti Lake and the Rio Grande.

Small Mammals

The Decision Area provides habitat for 66 of the 85 species of mammals identified in Sandoval County. Rabbit species include the cottontail and black-tailed jackrabbit. Common rodents in the area include the Colorado chipmunk, least chipmunk, Gunnison's prairie dog, white-tailed antelope ground squirrel, rock squirrel, silky pocket mouse, Western harvest mouse, deer mouse, brush mouse, piñon mouse, rock mouse, white-footed deer mouse, Northern grasshopper mouse, white-throated woodrat, and porcupine. Carnivores include the long-tailed weasel, badger, bobcat, coyote, striped skunk, and gray fox.

Birds

A wide variety of bird species inhabits the Decision Area, as shown below in Table 3-14. Neotropical migratory birds comprise 57 of the 149 species of birds potentially occurring in the area. These birds are the subject of increasing scrutiny and concern because of their general decline over the entire country. On the Pajarito Plateau, 38 species of breeding birds occur in the dominant plant community, piñon-juniper woodlands. The ten species that breed exclusively in this habitat are listed in the table. Another six species breed exclusively in cliff areas, as listed below. Those neo-tropical species that are of special conservation concern are also listed in the table.

TABLE 3-14

NEOTROPICAL MIGRATORY BIRDS IN THE DECISION AREA

<p><u>Common Birds</u> ash-throated flycatcher American robin black-headed grosbeak brown-headed cowbird Cassin's kingbird cliff swallow common raven house finch lesser goldfinch plain titmouse spotted towhee violet-green swallow Western bluebird</p>	<p><u>Birds Breeding Exclusively in Cliff Areas</u> canyon wren cliff swallow rock wren rufous-crowned sparrow turkey vulture white-throated swift</p>
<p><u>Birds Breeding Exclusively in Piñon-Juniper Woodlands</u> Bewick's wren black-chinned hummingbird blue-gray gnatcatcher blue grosbeak bushtit Cassin's kingbird canyon towhee gray flycatcher piñon jay plain titmouse</p>	<p><u>Neo-Tropical Birds of Special Conservation Concern ^a</u> Bendire's thrasher black swift black-throated gray warbler burrowing owl Crissal thrasher ferruginous hawk flamulated owl golden eagle Grace's warbler gray vireo Lewis' woodpecker Northern harrier piñon jay prairie falcon Swainson's hawk Virginia's warbler Williamson's sapsucker</p>

Note: ^a Taken from the 2002 list, BCR 16 (Southern Rockies/ Colorado Plateau), *Federal Register* Vol. 68, No. 25; Thursday, February 6, 2003 (edited for birds occurring only in the piñon-juniper savanna ecotypes).

Invertebrates

The Decision Area has not been surveyed for invertebrate species, and records of these species

in Sandoval County are sketchy. It is assumed that most of the nonaquatic arthropod species surveyed at Bandelier National Monument also occur in the Decision Area.